mechanism remained to be resolved, and this provided the focus of ongoing work in biochemistry. Although the locus of research on oxidative phosphorylation shifted after about 1970 to biochemistry, the research in the prior decades was an outstanding exemplar of research in the new field of cell biology. By revealing structure and organization at a level between older biochemistry and traditional cytology, de Duve's terra incognita had become an explored territory.

2. MICROSOMES, THE ENDOPLASMIC RETICULUM, AND RIBOSOMES

From Lace-like Reticulum to Endoplasmic Reticulum

As I discussed in the previous chapter, Claude first identified microsomes through cell fractionation while Porter, examining his electron micrographs, described a lace-like reticulum with granules and identified Claude's microsomes with what appeared as granules in it. Although Claude remained agnostic, many investigators proposed that microsomes were involved in protein synthesis. At the same time as research on the mitochondrion was revealing the mechanism of oxidative phosphorylation, researchers were making rapid advances in their understanding of these additional cytoplasmic structures, an endeavor that culminated in an account of how the structures figured in protein synthesis. Porter played a key role in initiating these developments. In papers published in 1952 and 1953 he, together with Frances Kallman, a postdoctoral fellow of the National Cancer Institute, captured images of this lace-like reticulum by increasing the time of fixation in osmium vapors. Porter proposed that the osmium vapor digested the "diffuse and frequently fibrous components of the ground substance" leaving "what may be thought of as a membrane skeleton of the cell" (Porter & Kallman, 1952, p. 883). With this technique, Porter and Kallman provided a further description of Porter's lace-like reticulum and gave it a new name:

> A third component uniformly present in these images is made up of vesicular or canalicular elements which sometimes constitute a complex reticulum. This material is part of the innermost cytoplasm of the cell, the endoplasm. It is referred to as the endoplasmic reticulum from its location and form. It appears to be a finely divided vacuolar system. It varies enormously in different cells in the size of its division and, though its function is not known, this variation reflects in part the physiological state of the cell at the time of fixation. Phase contrast microscopy provides evidence of its presence in the living cell. (p. 883)